PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2002-152309

(43)Date of publication of application : 24.05.2002

---

(51)Int.Cl. H04L 29/08
H04L 12/28

---

(21)Application number : 2000-348575

(22)Date of filing : 15.11.2000

(71)Applicant : SHARP CORP

(72)Inventor : IWAMOTO AKIRA

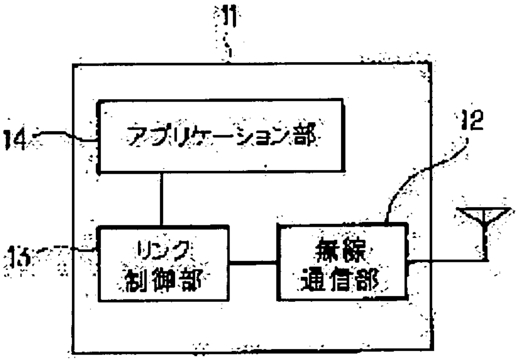
---

(54) BLUETOOTH APPARATUS

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a Bluetooth (R) apparatus which is capable of saving electric power when data communication is not maintained, establishing a link in a shorter time, and protecting a logic link against disconnection near a critical communication range in which communication can be maintained.

SOLUTION: A Bluetooth (R) apparatus 11 is composed of a radio communication unit 12 which makes radio communication, a link control unit 13 which controls the connection/cutoff of a physical link for the radio communication unit 12, and an application unit 14 which includes the upper layer of a Bluetooth (R) protocol stack and a man-machine interface. The link control unit 13 makes the radio communication unit 12 cut off the physical link and the application unit 14 hold a logic link when the data communication is not maintained.



LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

BEST AVAILABLE COPY

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

Copyright (C); 1998,2003 Japan Patent Office

* NOTICES *

JPO and NCIPI are not responsible for any damages caused by the use of this translation.

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

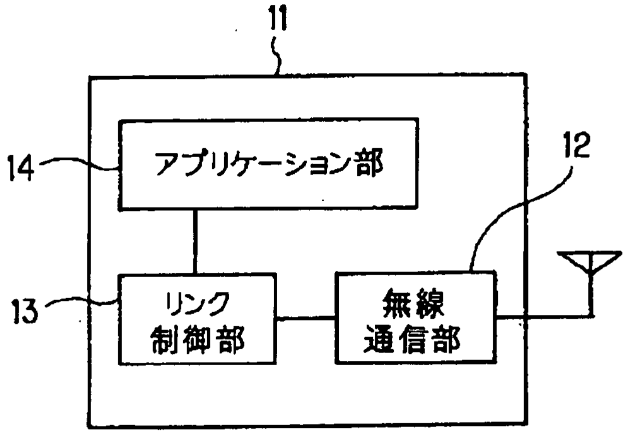
CLAIMS

[Claim(s)]
[Claim 1] In the Bluetooth device which mounted mutually application which can communicate The Radio Communications Department for transmitting and receiving data on radio, and the link control section which controls the Radio Communications Department, builds a physical link, and offers a logical link to the high order layer on a protocol stack, When it has the application section containing the high order layer of a user interface or a Bluetooth protocol and data communication is not performed after logical-link connection between said application sections It is the Bluetooth device characterized by cutting a physical link automatically, without said link control section depending on a demand from said application section, and the logical link holding.
[Claim 2] Said link control section is a Bluetooth device according to claim 1 characterized by cutting a logical link when an inquiry is continued to a partner Bluetooth device for every predetermined time when there is a response from a partner Bluetooth device, and there is no response from a partner Bluetooth device.
[Claim 3] Said link control section is a Bluetooth device according to claim 1 characterized by cutting a logical link when the further predetermined count inquiry was performed when it detected that the partner Bluetooth device separated out of [which can be communicated] distance, it continues holding a logical link when there is a response, and there is no response.
[Claim 4] When the notice of unlinking by the partner Bluetooth device having separated from said link control section during the asynchronous-data communication link out of [which can be communicated] distance is received, An asynchronous-data communication link is interrupted temporarily, applying a flow control to the application section with a logical link held. The Bluetooth device according to claim 1 characterized by cutting a logical link when the predetermined count inquiry was performed, a physical link is connected again, an asynchronous-data communication link is resumed when there is a response from a partner Bluetooth device, and there is no response.
[Claim 5] In the Bluetooth device which mounted mutually application which can communicate The Radio Communications Department for transmitting and receiving data on radio, and the link control section which controls this Radio Communications Department, builds a physical link, and offers a logical link to the

high order layer on a protocol stack, The application section containing the high order layer of a user interface or a Bluetooth protocol, It has the microphone for inputting voice, the loudspeaker for outputting voice, an audio codec, and the PCM codec section equipped with the function to make the sound of arbitration. Said link control section When the notice of unlinking by the partner Bluetooth device having separated during voice communication out of [which can be communicated] distance is received, It is shown that perform a predetermined count inquiry, and create a sound in the PCM codec section to the meantime, and it is made to generate in a loudspeaker, and is [re-/ of a physical link] under connection. The Bluetooth device characterized by cutting a logical link when a physical link is connected again, voice communication is resumed when there is a response from a partner Bluetooth device, and there is no response.

[Translation done.]

Drawing selection Representative drawing ▼


11
14
アプリケーション部
12
13
リンク
制御部
無線
通信部

[Translation done.]

* NOTICES *

JPO and NCIPI are not responsible for any damages caused by the use of this translation.

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the Bluetooth device which performs radio in accordance with Bluetooth protocols, such as a Personal Digital Assistant, a cellular phone, and a personal computer.
[0002]
[Description of the Prior Art] Conventionally, many intermittent receiving methods with which the radio equipment which has a multi-channel access method (MCA method) makes a receiving side the receive mode intermittently a fixed period for power-saving are used. That is, a certain time interval is set, the power for actuation is supplied to a receive section, in between, a predetermined idle period is set and reception actuation is performed intermittently. Furthermore, in JP,8-265823,A, by limiting the channel which a receiving side scans during intermittent reception to the channel group whom the transmitting side and the receiving side fixed, the time amount of the receive mode of a receiving side is shortened, and power-saving is promoted. On the other hand, the Park mode in which actuation for power saving is performed also in Bluetooth is prepared. When the physical link is established, even if transmission and reception of data are not performed, a master and a slave take a synchronization to predetermined timing. And a physical link will be cut if it becomes impossible to take a synchronization.
[0003]
[Problem(s) to be Solved by the Invention] Since a master and a slave take a synchronization to predetermined timing and hold the physical link in the Park mode, it can return to the active state in which data communication is possible in a short time, but although it is power-saving mode, if the Park mode has taken the synchronization at all periodically, power is consumed rather than the condition that the link is not connected. On the other hand, in connecting the link between slaves with a master from the beginning, the logical link of each layer of a Bluetooth protocol needs to be establishment processed other than connection of a physical link, and before starting data communication, it will take time amount. On the other hand, there is a limitation in the distance with which a Bluetooth device can communicate, a physical link will be easy to be cut in the marginal distance neighborhood, and it will be interrupted also in data communication.
[0004] This invention is what reviewed the above-mentioned problem, can attain

shortening of the time amount to a linkup, and aims at offering the Bluetooth device by which a logical link is hard to be cut in the marginal neighborhood of the distance which can communicate while it attains power-saving when data communication is not performed.

[0005]

[Means for Solving the Problem] In the Bluetooth device by which the 1st invention mounted mutually application which can communicate The Radio Communications Department for transmitting and receiving data on radio, and the link control section which controls the Radio Communications Department, builds a physical link, and offers a logical link to the high order layer on a protocol stack, When it has the application section containing the high order layer of a user interface or a Bluetooth protocol and data communication is not performed after logical-link connection between said application sections It is characterized by cutting a physical link automatically, without said link control section depending on a demand from said application section, and the logical link holding.

[0006] In said Bluetooth device, said link control section continues an inquiry to a partner Bluetooth device for every predetermined time, when there is a response from a partner Bluetooth device, and 2nd invention is characterized by cutting a logical link, when there is no response from a partner Bluetooth device.

[0007] In said Bluetooth device, the 3rd invention performs a further predetermined count inquiry, when it detects that the partner Bluetooth device separated from said link control section out of [which can be communicated] distance, when there is a response, it holds a logical link continuously, and when there is no response, it is characterized by cutting a logical link.

[0008] The 4th invention is set to said Bluetooth device. Said link control section When the notice of unlinking by the partner Bluetooth device having separated during the asynchronous-data communication link out of [which can be communicated] distance is received, An asynchronous-data communication link is interrupted temporarily, applying a flow control to the application section with a logical link held. When the predetermined count inquiry was performed, a physical link is connected again, an asynchronous-data communication link is resumed, when there is a response from a partner Bluetooth device, and there is no response, it is characterized by cutting a logical link.

[0009] In the Bluetooth device by which the 5th invention mounted mutually application which can communicate The Radio Communications Department for transmitting and receiving data on radio, and the link control section which controls this Radio Communications Department, builds a physical link, and offers a logical link to the high order layer on a protocol stack, The application section containing the high order layer of a user interface or a Bluetooth protocol,

* NOTICES *

JPO and NCIPI are not responsible for any
damages caused by the use of this translation.

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

TECHNICAL FIELD

[Field of the Invention] This invention relates to the Bluetooth device which performs radio in accordance with Bluetooth protocols, such as a Personal Digital Assistant, a cellular phone, and a personal computer.

[Translation done.]

* NOTICES *

JPO and NCIPI are not responsible for any damages caused by the use of this translation.

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

PRIOR ART

[Description of the Prior Art] Conventionally, many intermittent receiving methods with which the radio equipment which has a multi-channel access method (MCA method) makes a receiving side the receive mode intermittently a fixed period for power-saving are used. That is, a certain time interval is set, the power for actuation is supplied to a receive section, in between, a predetermined idle period is set and reception actuation is performed intermittently. Furthermore, in JP,8-265823,A, by limiting the channel which a receiving side scans during intermittent reception to the channel group whom the transmitting side and the receiving side fixed, the time amount of the receive mode of a receiving side is shortened, and power-saving is promoted. On the other hand, the Park mode in which actuation for power saving is performed also in Bluetooth is prepared. When the physical link is established, even if transmission and reception of data are not performed, a master and a slave take a synchronization to predetermined timing. And a physical link will be cut if it becomes impossible to take a synchronization.

[Translation done.]

* NOTICES *

JPO and NCIPI are not responsible for any damages caused by the use of this translation.

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

EFFECT OF THE INVENTION

[Effect of the Invention] As mentioned above, according to the 1st invention, while not performing data communication, the need of performing radio by cutting a physical link does not need to be lost, and it is not necessary to consume the part power. Moreover, that what is necessary is to make only connection of a physical link, when data communication is again started by continuing holding a logical link, since the linkup demand in establishment of a logical link and the exchange of the message of a negotiation are omissible, a re-connect time can be shortened.
[0031] Moreover, according to the 2nd invention, while cutting the physical link, with a logical link held, it can detect having separated from the distance which can be communicated at an early stage by asking periodically to a phase hand-loom machine.
[0032] Moreover, also when it detects having separated from the distance which can be communicated, and coming out of the distance which can be communicated or entering by continuing a predetermined time amount inquiry, according to the 3rd invention, holding a logical link can be continued.
[0033] Moreover, according to the 4th invention, by interrupting data transmission temporarily, applying a flow control to the application section, when it detects having separated during the asynchronous-data communication link from the distance which can be communicated, when a physical link is connected again, data communication can be resumed.
[0034] Moreover, according to the 5th invention, when it detects having separated during voice communication from the distance which can be communicated, by making a sound from a PCM codec during re-connection, and generating in a loudspeaker can show that the physical link broke off and voice communication is interrupted and that a physical link is [re-] under connection.

[Translation done.]

* NOTICES *

JPO and NCIPI are not responsible for any damages caused by the use of this translation.

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] Since a master and a slave take a synchronization to predetermined timing and hold the physical link in the Park mode, it can return to the active state in which data communication is possible in a short time, but although it is power-saving mode, if the Park mode has taken the synchronization at all periodically, power is consumed rather than the condition that the link is not connected. On the other hand, in connecting the link between slaves with a master from the beginning, the logical link of each layer of a Bluetooth protocol needs to be establishment processed other than connection of a physical link, and before starting data communication, it will take time amount. On the other hand, there is a limitation in the distance with which a Bluetooth device can communicate, a physical link will be easy to be cut in the marginal distance neighborhood, and it will be interrupted also in data communication.
[0004] This invention is what reviewed the above-mentioned problem, can attain shortening of the time amount to a linkup, and aims at offering the Bluetooth device by which a logical link is hard to be cut in the marginal neighborhood of the distance which can communicate while it attains power-saving when data communication is not performed.

[Translation done.]

* NOTICES *

JPO and NCIPI are not responsible for any damages caused by the use of this translation.

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

MEANS

[Means for Solving the Problem] In the Bluetooth device by which the 1st invention mounted mutually application which can communicate The Radio Communications Department for transmitting and receiving data on radio, and the link control section which controls the Radio Communications Department, builds a physical link, and offers a logical link to the high order layer on a protocol stack, When it has the application section containing the high order layer of a user interface or a Bluetooth protocol and data communication is not performed after logical-link connection between said application sections It is characterized by cutting a physical link automatically, without said link control section depending on a demand from said application section, and the logical link holding.
[0006] In said Bluetooth device, said link control section continues an inquiry to a partner Bluetooth device for every predetermined time, when there is a response from a partner Bluetooth device, and 2nd invention is characterized by cutting a logical link, when there is no response from a partner Bluetooth device.
[0007] In said Bluetooth device, the 3rd invention performs a further predetermined count inquiry, when it detects that the partner Bluetooth device separated from said link control section out of [which can be communicated] distance, when there is a response, it holds a logical link continuously, and when there is no response, it is characterized by cutting a logical link.
[0008] The 4th invention is set to said Bluetooth device. Said link control section When the notice of unlinking by the partner Bluetooth device having separated during the asynchronous-data communication link out of [which can be communicated] distance is received, An asynchronous-data communication link is interrupted temporarily, applying a flow control to the application section with a logical link held. When the predetermined count inquiry was performed, a physical link is connected again, an asynchronous-data communication link is resumed, when there is a response from a partner Bluetooth device, and there is no response, it is characterized by cutting a logical link.
[0009] In the Bluetooth device by which the 5th invention mounted mutually application which can communicate The Radio Communications Department for transmitting and receiving data on radio, and the link control section which controls this Radio Communications Department, builds a physical link, and offers a logical link to the high order layer on a protocol stack, The application section containing the high order layer of a user interface or a Bluetooth protocol, It has

the microphone for inputting voice, the loudspeaker for outputting voice, an audio codec, and the PCM codec section equipped with the function to make the sound of arbitration. Said link control section When the notice of unlinking by the partner Bluetooth device having separated during voice communication out of [which can be communicated] distance is received, It is shown that perform a predetermined count inquiry, and create a sound in the PCM codec section to the meantime, and it is made to generate in a loudspeaker, and is [re-/ of a physical link] under connection. When a physical link is connected again, voice communication is resumed, when there is a response from a partner Bluetooth device, and there is no response, it is characterized by cutting a logical link.

[0010] A physical link is cut in this invention, holding a logical link in power-saving, first, when the existence of data communication is checked and data communication is not performed. In order to check whether a phase hand-loom machine exists in the meantime in [which can be communicated] distance, it asks periodically. In this case, the period longer than the period to which a master and a slave take a synchronization in the Park mode which asks is taken. A logical link is cut when there is no response to an inquiry. If data communication is started in the condition, it will be detected and a physical link will be connected.

[0011] In this way, while not performing data communication, the need of performing radio by cutting a physical link does not need to be lost, and it is not necessary to consume the part power. Moreover, that what is necessary is to make only connection of a physical link, when data communication is again started by continuing holding a logical link, since the linkup demand in establishment of a logical link and the exchange of the message of a negotiation are omissible, a re-connect time can be shortened.

[0012] On the other hand, while cutting the physical link, with a logical link held, it can detect having separated from the distance which can be communicated at an early stage by asking periodically to a phase hand-loom machine.

[0013] Also when it detects having separated from the distance which can be communicated, and coming out of the distance which can be communicated or entering by continuing a predetermined time amount inquiry, holding a logical link can be continued.

[0014] Moreover, by interrupting data transmission temporarily, applying a flow control to the application section, when it detects having separated during the asynchronous-data communication link from the distance which can be communicated, when a physical link is connected again, an asynchronous-data communication link can be resumed.

[0015] Moreover, when it detects having separated during voice communication from the distance which can be communicated, by making a sound from a PCM codec during re-connection, and generating in a loudspeaker can show that the physical link broke off and voice communication is interrupted and that a physical link is [re-] under connection.

[0016]

[Embodiment of the Invention] A drawing explains the gestalt of operation of this invention below. Drawing 1 is the block diagram showing 1 operation gestalt of the Bluetooth device concerning this invention. The Bluetooth device 11 consists of the

Radio Communications Department 12 which performs radio, the link control section 13 which controls connection/cutting of a physical link to the Radio Communications Department, and the application section containing a high order layer, a man machine interface, etc. of a Bluetooth protocol stack.
[0017] Drawing 2 - drawing 5 are flow charts which show processing of the link control section 13 in this Bluetooth device. Usually, a physical link will be connected by control of the link control section 13, the logical link of the application section will be established after that, and the link control section 13 will hold the information on the correspondence relation between a physical link and a logical link. an ACL link asynchronous in the link of Bluetooth, and connectionless on the other hand, and connection of synchronous system -- there is a SCO link which is a link [****]. An asynchronous-data communication link is performed through an ACL link, and synchronous data communication is performed by the SCO link. Among these, although a SCO link is used in order to transmit the character overtone voice, and control of connection/cutting is performed in the link control section 13, actual data are hard, and since the Radio Communications Department 12 is passed from a direct PCM codec, they cannot perform decision of being under data communication in the link control section 13.
[0018] Then, as shown in drawing 2 , as for the link control section 13, the ACL link where data communication is performed through the link control section 13 judges first whether it is under [data communication] ******** (S21). Whenever it transmits and receives each packet, it is necessary to start a timer (if required, the timer which last time started will be canceled), and since each data is divided, transmitted and received by the packet at this time, when that timer expired, it is necessary to judge that it is not during data communication.
[0019] Next, although it is a SCO link, since it cannot judge as aforementioned whether it is under [data communication] ****** in the link control section 13 in a SCO link, the link control section 13 identifies whether a link is in a connection condition, or it is in a cutting condition (S22). After passing S21 and S22, the link control section 13 sends out an unlinking demand to the Radio Communications Department 12 (S23). The information to which the link control section 13 manages the correspondence relation between a physical link and a logical link etc. at this time changes only the flag which shows the connection condition of a physical link without discarding.
[0020] In this way, the need of performing radio does not need to disappear from the Radio Communications Department 12, and it is not necessary to consume the part power by cutting a physical link. Moreover, that what is necessary is to make only connection of a physical link, when data communication is again started by continuing holding a logical link, since the link control section 13 can omit the linkup demand in establishment of a logical link, and the exchange of the message of a negotiation, it can shorten a re-connect time.
[0021] Next, as shown in drawing 3 , if the link control section 13 goes into the condition of cutting the physical link, with a logical link held, it will start a timer (S41). With the Bluetooth device which the Inquiry demand was performed by the Bluetooth device which was a master when a physical link connected [be / it], and was a slave when the timer expired (S42), it is Inquiry. scan is performed

(S43). By setting up the time amount which performs each for a long time, the error of the timer between each Bluetooth device is absorbable. A result is identified (S44), if there is a response, a timer will be started again (S41), if there is no response, the notice of cutting will be sent to the application section 14 like the time of an unlinking demand coming from the other party, and cutting processing of a logical link will be performed (S45).
[0022] In this way, while cutting the physical link, with a logical link held, as long as there is a response, if only predetermined time amount sets a timer and it completes it, the link control section 13 will be asked to a phase hand-loom machine, or will perform an inquiry scan. Thus, it is detectable immediately by asking repeatedly periodically and judging whether there is any response that the partner Bluetooth device separated from the distance which can be communicated.

[0023] Moreover, other examples in the condition of cutting the physical link, with a logical link held are shown in drawing 4 . A counter will be incremented, if there are not (S52-S55), and a response while resetting a counter (S51) and asking as mentioned above (S56). Next, if the value of a counter was investigated and it is over constant value (S57), the notice of cutting will be sent to the application section 14 like the time of an unlinking demand coming from the other party, and cutting processing of a logical link will be performed (S58). If the value of a counter is not over constant value, it asks again (S52-S55). If there is a response when it asks again, a counter will be reset (S51) and processing of an inquiry will be continued (S52-S55).
[0024] In this way, link ******** 13 can continue holding a logical link, also when it detects that the phase hand-loom machine separated from the distance which can be communicated, and coming out of the distance which can be communicated or entering by not cutting a logical link but continuing a predetermined time amount inquiry. In this way, when a phase hand-loom machine goes into the distance which can be communicated, a link can be established immediately and a re-connect time can be shortened.
[0025] Next, the processing at the time of receiving the notice of unlinking during an asynchronous-data communication link is explained. If the notice of unlinking is received when two Bluetooth devices separated too much during the asynchronous-data communication link as shown in drawing 5 (S61), the message of Flow OFF will be notified to the application section 14, and an asynchronous-data communication link will be interrupted (S62). A counter is reset (S63) and the count inquiry of fixed is tried (S64-S67). A logical link will be cut if there is no response to all inquiries (S68). If there is a response, connection processing of a physical link will be performed (S69), the message of Flow ON is notified to the application section 14, and an asynchronous-data (S70) communication link is resumed.
[0026] Thus, data transmission is interrupted temporarily, applying a flow control to the application section, without cutting a logical link completely, when it detects having separated during the asynchronous-data communication link from the distance which can be communicated. By this, since a logical link is in a connection condition when a physical link is connected again, data communication can be

resumed immediately.

[0027] Drawing 6 is the block diagram showing other operation gestalten of the Bluetooth device concerning this invention. Since an audio codec, the PCM codec section 15 equipped with the function to make the sound of arbitration, the microphone 16 for inputting voice, and voice are outputted in addition to the Bluetooth device of drawing 1 , this Bluetooth device is equipped with the loudspeaker 17.

[0028] Drawing 7 is a flow chart which shows processing of the link control section 13 in this Bluetooth device. If the notice of unlinking is received when two Bluetooth devices separated too much during voice communication by the SCO link (S71), it will control to make the sound generated during the re-connection decided at arbitration to be the PCM codec section 15 (S72), a counter will be reset (S73), and the count inquiry of fixed will be tried (S74-S77).

* NOTICES *

JPO and NCIPI are not responsible for any damages caused by the use of this translation.

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the block diagram showing 1 operation gestalt of the Bluetooth device concerning this invention.
[Drawing 2] It is the flow chart which shows processing of the link control section.
[Drawing 3] It is the flow chart which shows other processings of the link control section.
[Drawing 4] It is the flow chart which shows other processings of the link control section.
[Drawing 5] It is the flow chart which shows other processings of the link control section.
[Drawing 6] It is the block diagram showing other operation gestalten of the Bluetooth device concerning this invention.
[Drawing 7] It is the flow chart which shows other processings of the link control section.
[Description of Notations]

11	Bluetooth Device
12	Radio Communications Department
13	Link Control Section
14	Application Section
15	PCM Codec Section
16	Microphone
17	Loudspeaker

[Translation done.]

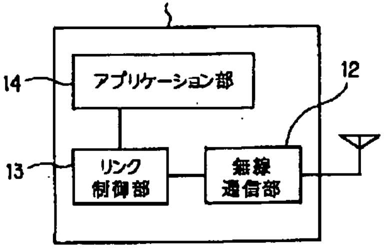
* NOTICES *

JPO and NCIPI are not responsible for any
damages caused by the use of this translation.

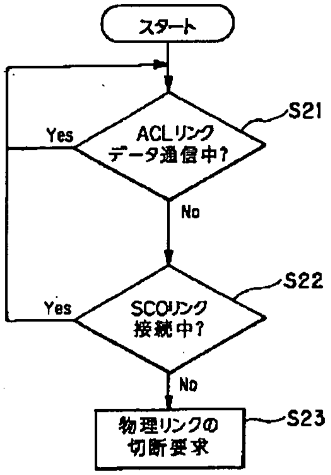
1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DRAWINGS

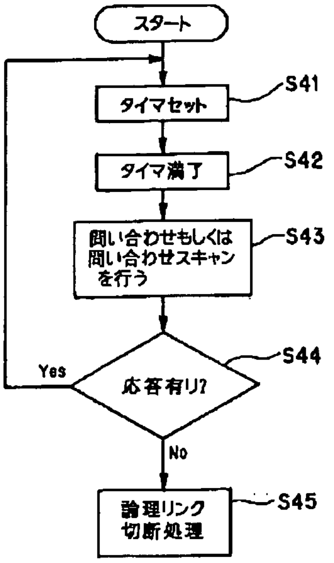
[Drawing 1]


11
14
アプリケーション部
12
13
リンク
制御部
無線
通信部

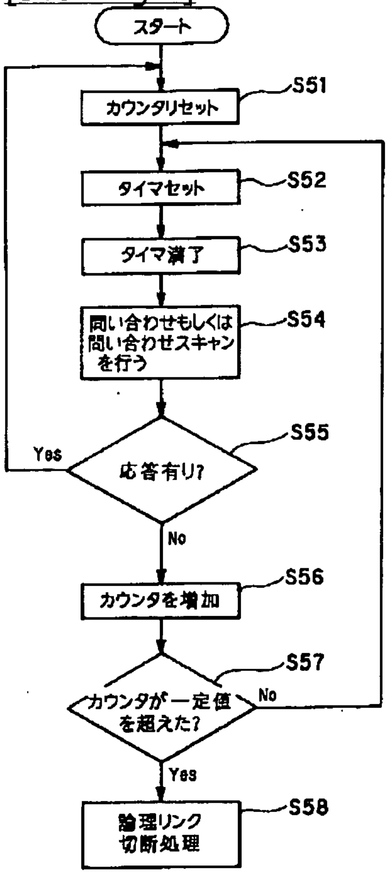
[Drawing 2]


スタート
S21
Yes
ACLリンク
データ通信中?
No
S22
Yes
SCOリンク
接続中?
No
物理リンクの
切断要求
S23

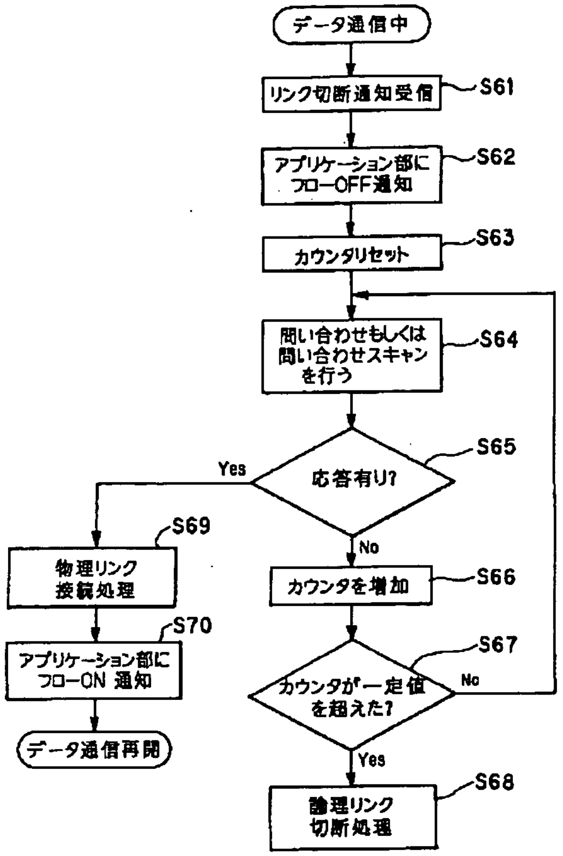
[Drawing 3]


スタート
タイマセット
S41
タイマ満了
S42
問い合わせもしくは問い合わせスキャンを行う
S43
応答有り?
S44
Yes
No
論理リンク切断処理
S45

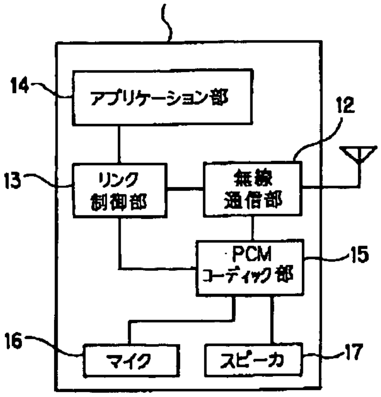
[Drawing 4]


スタート
カウンタリセット
S51
タイマセット
S52
タイマ満了
S53
問い合わせもしくは問い合わせスキャンを行う
S54
応答有り?
S55
Yes
No
カウンタを増加
S56
カウンタが一定値を超えた?
S57
No
Yes
論理リンク切断処理
S58

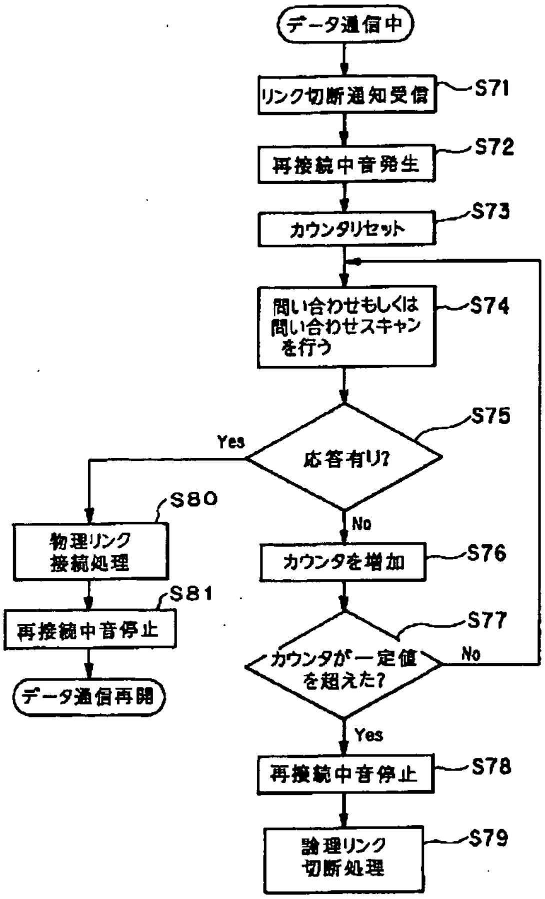
[Drawing 5]


データ通信中
リンク切断通知受信
S61
アプリケーション部にフローOFF通知
S62
カウンタリセット
S63
問い合わせもしくは問い合わせスキャンを行う
S64
S65
Yes
応答有り?
No
S69
物理リンク接続処理
カウンタを増加
S66
S70
S67
アプリケーション部にフローON 通知
カウンタが一定値を超えた?
No
データ通信再開
Yes
S68
論理リンク切断処理

[Drawing 6]


11
14
アプリケーション部
12
13
リンク制御部
無線通信部
PCM コーディック部
15
16
マイク
スピーカ
17

[Drawing 7]


データ通信中
リンク切断通知受信
S71
再接続中音発生
S72
カウンタリセット
S73
問い合わせもしくは問い合わせスキャンを行う
S74
応答有り?
S75
Yes
No
物理リンク接続処理
S80
再接続中音停止
S81
データ通信再開
カウンタを増加
S76
カウンタが一定値を超えた?
S77
No
Yes
再接続中音停止
S78
論理リンク切断処理
S79

[Translation done.]